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ABSTRACT

This collection of abstracts is part of a continuing series providing information on recent doctoral dissertations. The 20 titles deal with a variety of topics, including the following: use of word information cues by beginning readers; the relationship between problem solving and oral reading strategies; the ease with which children learn different logographic systems; the effects of adjunct questions, humor, and various learning modes on learning and retention; conceptual tempo and oral reading performance; the relationship of deep structure recovery to reading comprehension; children's ability to make inferences from written and oral material; the contributions of inference and discrimination processes to false recognition of sentences; initial consonant phoneme-grapheme correspondence errors; effects of different error types and of method of presentation of material on comprehension; the relation between syntactic form and familarity of content to reading comprehension; readers' perceptions of the reading process and of their own reading strategies; relationships between quality of oral reading errors and oral syntactic development; readers' use of contextual clues; and subvocalization during the silent reading process. (GW)

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AN EMG INVESTIGATION OF SUBVOCALIZATION DURING THE SILENT READING PROCESS

UTILIZATION OF WORD INFORMATION CUES IN THE PERCEPTION OF UNFAMILIAR WORDS BY NAIVE BEGINNING READERS

ARNOLD, Sarah Elizabeth Anderson, Ph.D.
University of Southern Mississippi, 1977

The Problem: Gibson and Levin's (1975) theory of word information processing cues served as the basis for studying the cues which naive beginning readers utilize to perceive the printed word. The study sought to determine if naive beginning readers respond differentially in the graphic domain to the visual memory of words in lower- and upper-case script; in the phonological domain to phonologically pronounceable and unpronounceable words; in the orthographic domain to orthographical legal and illegal words; in the semantic domain to concrete and abstract words; in the syntactic domain to nouns and verbs; and if pictures aid in the learning of words.

Methods: Twenty first-grade naive readers whose scores were average or above on the Metropolitan Reading Readiness Tests and the Lorge-Thorndike Cognitive Abilities Test were selected to participate in five separate coordinated perceptual experiments.

Experiment 1 was a delayed-recognition task with the subjects being asked to choose the same word as the stimulus word out of three words in both lower- and upper-case script.

Additionally, the response alternatives were analyzed to determine whether initial or final letters were more salient cues.

Experiment 2 was a training experiment with subjects (after training in phonics) being asked to choose a pronounceable word out of three words, one of which was phonologically pronounceable and two of which were unpronounceable.

Experiment 3 was a matching task with subjects being asked to choose a word that represented a picture out of three words, one of which was orthographically legal and two of which were illegal.

Experiment 4 was a word learning task with subjects being taught by a prompting technique three concrete and three abstract words, on a trials-to-criterion basis.

Experiment 5 was a word learning task which employed the same procedure as Experiment 4 except using nouns and verbs; however, an additional experiment was conducted to investigate whether picture cues aid in learning words with half of the subjects being presented the word with a picture for three training presentations while the other half received three training sessions with the word alone.

All hypotheses were tested by appropriate t tests.

Results: Significant differences were found for lower- and upper-case script with lower-case letters being more easily processed in short term memory than upper-case letters and for the response alternatives with initial letters being more salient cues than final letters. A significant difference was also found between the learning of nouns and verbs with subjects learning nouns more easily than verbs. No significant differences were found between the recognition of pronounceable and unpronounceable words and orthographically legal and illegal words. Also, no significant differences were found between the learning of concrete and abstract words and learning words with or without pictures.

Conclusions: It was concluded that the model of word information cues as posited by Gibson and Levin (1975) does seem to be reflected, at least to some extent, in the word perception skills of naive beginning readers. In the graphic domain, it was concluded that configuration as formed by the ascending and descending letters of lower-case script is a cue for the visual memory of words and that initial letters are more salient than final letters. In the phonological and orthographic domains, it was concluded that even though information was not extracted by the subjects, the skill to extract phonological and orthographic information might develop with increase in age and reading ability. In the semantic domain, it was concluded that neither concreteness nor abstractness seems to affect word learning. In the syntactic domain, it was concluded that nouns are more easily learned than verbs. Also, the addition of picture cues to a word learning task does not appear to influence learning efficiency. Order No. 77-22,858, 127 pages.

READING AS A PSYCHOLINGUISTIC PROCESS: A STUDY OF THE RELATIONSHIP BETWEEN PROBLEM SOLVING AND ORAL READING STRATEGIES IN SIXTH-GRADE CHILDREN

BLUSTEIN, Evelyn Semmel, Ed.D.
Columbia University Teachers College, 1977

Sponsor: Professor Jeannette E. Fleischner

The relationship between strategies employed in problem-solving and oral contextual reading was investigated to explore the reading-thinking processes of school-age children.

The research was predicated on psycholinguistic models. Reading was defined as the communication of information, the reduction of uncertainty by a series of decisions. According to the model, linguistic information enables the reader to transform surface structure representations of sound and graphic signals to the deep structure conveying meaning by applying known generative rules. The ability to transform information shifts developmentally toward the use of conceptual strategies, or rules for planning steps in problem solving. Thus, reading was considered as a type of problem.

The main hypotheses were that efficiency in problem solving would be positively correlated with efficient use of semantic and syntactic cues, while the use of phonemic and graphic cues would be inversely related. Comprehension and accuracy were predicted as positively related to problem-solving efficiency. Substitutions were expected to decrease as efficiency in problem solving increased.

Subjects were 90 sixth graders randomly selected from the population of one school district. Their mean age was 11.89. The IQ range was 77–142.

Two tasks were presented to each subject. The eight problems used for the problem-solving tasks consisted of eight permutations of circular patterns of eight black and white dots (Neimark, 1971). Each problem solution was hidden in a box whose shutters, when opened successively, revealed the pattern elements. With all its permutations available on a worksheet, the object was to identify a hidden pattern by opening as few shutters as possible. The information gained by each shutter opening was calculated, and the strategy score for all eight problems was derived.

Miscue analysis was used to determine strategy efficiency in reading. Subjects read orally while miscues were recorded. Subjects were asked comprehension questions. Twenty-five miscues were coded in eight categories and percentages were calculated for each category. Percentages were calculated for miscue types, miscues per hundred words, and comprehension.

Standardized IQ and achievement test scores (MAT) in reading, word knowledge, and mathematics problem solving were included in the data analysis.

Bivariate correlations were run between the problem-solving strategy scores and the other variables. Multivariate procedures were used to assess the combinatorial effects of reading variables and to determine their predictive value.

Results revealed trends supporting the main hypotheses, except that both the deep structure and the surface structure factors showed approximately equal strength in relation to the criterion variable. Phonemic correpondence dominated over graphic similarity. Accuracy, especially in combination with efficient use of cue systems, was associated with strategy rating. Comprehension showed a nonsignificant positive correlation. Standardized tests, forming a third factor, showed the best correlations with problem-solving efficiency. The best predictive index of problem-solving strategy score was derived from the significant variables in each of the three factors. A total of .50 of variance was accounted for by all the independent variables.

Data were interpreted as supporting psycholinguistic models implying that oral reading is a special type of problem solving in which strategies for information processing accesses both surface and deep linguistic information. An important difference between oral and silent reading was detected suggesting the importance of differentiating between strategies used for each. Accuracy alone seemed an inadequate measure of proficiency since meaning cannot be assured by an exact match

between text and reader response. Although miscue analysis illuminates the reading process, it may not be sensitive enough to semantic-syntactic interactions that can be accounted for by the unity of thought and language and which are probably essential to the understanding of reading as reasoning.

Order No. 77-22,237, 154 pages.

A COMPARATIVE STUDY OF YOUNG CHILDREN'S EASE OF LEARNING WORDS REPRESENTED IN THE GRAPHIC SYSTEMS OF REBUS, BLISS, CARRIER-PEAK, AND TRADITIONAL ORTHOGRAPHY

CLARK, Charlotte Rose, Ph.D.
University of Minnesota, 1977

Logographic systems are being utilized more frequently in instruction and research with nonhandicapped and handicapped individuals. Formerly, no comparison among the three most frequently used logographic systems (Carrier-Peak, Bliss, and Rebus) and traditional orthography (T.O.) had been made to investigate which type of system might be easiest to learn.

The purpose of the present study was to compare the ease of learning words represented in the four graphic systems mentioned above. The Carrier-Peak symbols, normally moveable abstract shapes, were converted to graphic form for this study.

Subjects were 36 nonreading boys and girls ranging in chronological age from four years, four months to five years, five months. Mental ages ranged from four years, four months to five years, seven months as measured by the Peabody Picture Vocabulary Test. From a pool of children in four day care centers in a large metropolitan area of the upper midwest, subjects were randomly selected and assigned to one of four experimental conditions, Carrier-Peak, Bliss, Rebus, and T.O. Each condition contained nine subjects.

A sample of 15 words was randomly selected from the pool of 26 words common to all four graphic systems. The set of 15 words consisted of nouns, main verbs, and prepositions.

The experimental task contained eight levels. At each level the subject was presented a stimulus page and then a response page. On the stimulus page the examiner pointed to a word, said it, and had the subject repeat the word. The stimulus page for the first level had one word. All other stimulus pages had two words. On the response page the subject was required to say each word as the examiner pointed to it. If a word was missed, the subject was corrected. The number of words on a response page from the first level to the eighth level was, respectively: 1, 3, 5, 7, 9, 11, 13, and 15. The number of words correct on the 15-word page was the criterion measure.

Planned orthogonal comparisons were utilized in analyzing the data. Contrasts were made between: 1) The three logographic systems (Carrier-Peak, Bliss, and Rebus) and T.O., 2) two partially iconic logographies (Bliss, and Rebus) and a noniconic logography (Carrier-Peak), 3) a logography with mostly realistically drawn symbols (Rebus) and one whose symbols are highly stylized (Bliss).

In all three contrasts, significant differences were found. The three logographic systems were significantly easier ($p < .001$) to learn than T.O.; the partially iconic logographies were significantly easier ($p < .001$) to learn than the noniconic logography; and the Rebus system was significantly easier ($p < .05$) to learn than the Bliss system.

Previous research has indicated that logographic systems furnish a highly useful tool for learning especially in situations in which T.O. may be less efficient. This includes work with preschool children and handicapped individuals. Results of the present study indicate that partially iconic logographic systems are easier to learn than noniconic systems and thus may be more efficient for certain instructional and communication purposes. Furthermore, the Rebus system may be the most effective system to use with very young children since it was the easiest of the four systems to learn.

Order No. 77-26,084, 178 pages.

A QUASI-EXPERIMENTAL ANALYSIS OF THE EFFECTS OF ADJUNCT QUESTIONS ON RETENTION

FEIL, Philip Harry, Ed.D.
Indiana University, 1977

Chairperson: Thomas M. Schwen

In spite of the large number of studies dealing with adjunct questions, valid prescriptions regarding their use in facilitating classroom reading assignments have not been available. Since subjects in past studies were prohibited from looking back and forth between the text's passages and the interspersed questions, the results of those studies were not generalizable to the classroom.

A review of the literature indicated that when results were significant, they generally favored the postquestion group on both intentional and incidental retention. However, the results were not persistent since roughly only one-half of the studies replicated these effects. An analysis of the materials used in these studies revealed a number of common factors which may have contributed to the positive mathemagenic effects.

The purposes of the present study were to determine whether interspersed questions should be recommended for use by the college classroom practitioner in order to facilitate retention from reading material; to determine which of the past results could be replicated under more strict experimental procedures; and, to identify a theoretical explanation which could account for the results of all studies.

A 3 x 2 x 2 x 2 x 2 analysis of variance with repeated measures on the last two variables (item type and order) was used to determine the effects of adjunct questions combined with one of two levels of instructions and referral on retention. Two 3 x 2 x 2 ANOVAs were used to evaluate the effects of the independent variables on interspersed questions and running time. Regression analysis was used to determine the relationship between running time and retention. Two hundred and forty junior and senior education students from three intact classrooms read a 4000 word excerpt rated at the grade 13-15 readability level. An interspersed question appeared either before or after each of the excerpt's fourteen passages. A posttest was administered immediately upon a student's completion of the materials.

Results indicated that the retention of intentional items was greater than that of incidental items. While both questioned groups exceeded the control group on intentional retention, all groups obtained equivalent scores on incidental retention. The prequestion group scored significantly higher than the postquestion group on intentional retention, and both significantly exceeded the intentional score of the control group. Referral further elevated the scores for the two question position groups on intentional retention. Based on these results and on a review of existing practical applications, the use of interspersed questions was recommended for classroom use.

Significantly facilitated incidental retention for the QA group was not replicated in this study. A number of reasons dealing with the differences between the materials used in this study and those used in previous studies was thought to account for this situation.

Selective attention and rehearsal were held to account for the results from adjunct questions. Selective attention is probably induced by the interspersed question. Explicit instructions and referral seemed to be indirectly related to selective attention by virtue of their facilitating effect on interspersed question performance. The act of identifying the answer to the interspersed question was seen as initiating the rehearsal process. The opportunity to refer facilitated the effectiveness of the interspersed questions on rehearsal.

The relationship between running time and retention for the various treatment conditions was very complex. Apparently, the nature of the relationship was differentially molded by the various combinations of the treatment condition. The inability to determine the amount of time Ss spend processing the materials as opposed to the time spent engaged in irrelevant behaviors, made running time an ineffective measure of rehearsal, and similarly an ineffective predictor of performance.

Order No. 77-27,028, 239 pages.

CONCEPTUAL TEMPO AND ORAL READING PERFORMANCE

FISHER, Sharon Ann, Ed.D.
State University of New York at Albany, 1977

Chairman: Dr. E.R. Sipay

Combining the theories of conceptual tempo and reading as hypothesis testing suggests that impulsive and reflective children may perform differently when reading orally. This study investigated whether impulsives made quantitatively more and qualitatively different miscues than reflectives. Based on prior research and theoretical constructs, it was hypothesized that (1) impulsives would make significantly more miscues than reflectives; (2) there would be a significant interaction between conceptual tempo and type of miscue; (3) there would be a significant interaction for conceptual tempo by type of miscue by level of difficulty of the reading material.

Having established average reading ability and the conceptual tempo of the subjects, a random sample of 20 impulsives and 20 reflectives was drawn. Three samples of oral reading performance at easy, appropriate, and difficult levels were obtained. The miscues generated during the reading were then classified as graphically similar, syntactically acceptable, or semantically acceptable.

The data yielded a 2 x 3 x 3 (conceptual tempo by type of miscue by level of difficulty of the material) mixed design with repeated measures over the second and third factors. When the analysis of variance indicated that an overall F test was significant, the Newman-Kuels procedure was used to determine where the differences existed.

The findings of this study indicated that impulsives and reflectives did not differ significantly in the total number of miscues they made when reading material at three levels of difficulty. This may be due in part to the method employed in the selection of subjects and the low number of miscues made.

When the miscues were averaged over the three levels of reading difficulty, on the average, impulsives made significantly more graphically similar miscues than did reflectives, but they did not differ significantly in the number of semantically acceptable miscues. The findings suggest that (a) impulsives rely on graphic cues and report their first hypothesis, (b) both groups make use of semantic cues.

When reading material commensurate with their reading ability, on the average: (a) impulsives made significantly more graphically similar miscues than reflectives; (b) reflectives made significantly more syntactically acceptable miscues than impulsives; (c) there was no significant difference between the groups in the semantically acceptable miscues; (d) impulsives did not make significantly more graphically similar miscues than syntactically or semantically acceptable miscues; (e) reflectives made significantly more syntactically acceptable miscues than semantically acceptable or graphically similar.

When reading material two years above their level of reading ability, on the average: (a) impulsives made significantly more graphically similar miscues than reflectives; (b) impulsives and reflectives did not differ significantly in syntactically or semantically acceptable miscues; (c) impulsives made significantly more graphically similar miscues than syntactic or semantically acceptable miscues; (d) reflectives did not differ significantly in the graphically similar, syntactically or semantically acceptable miscues they made.

These findings suggest that when reading difficult material both groups made use of the three cue systems, but that the impulsives relied more heavily on the graphic cues than did the reflectives.

Overall, the data suggest that impulsives and reflectives do not differ in the type of miscues made when reading easy material. However, when reading material of appropriate difficulty or material which is difficult, impulsives tended to rely more heavily on graphic cues than did reflectives. Both groups made use, although not equal use, of the three cue systems regardless of the difficulty of the material.

Order No. 77-24,879, 82 pages.

AN INVESTIGATION OF DEEP STRUCTURE RECOVERY AND ITS RELATIONSHIP TO READING COMPREHENSION

HAYNES, Jack Eugene, Ed.D.
Northern Illinois University, 1977

Director: DeWayne Triplett

The major purposes of this study were: (1) to determine if a relationship existed between reading comprehension and subjects' skill at recovering the deep structure sentences; (2) to compare three different methods of measuring deep structure recovery skill; and (3) to examine grade level characteristics of the methods used in the study for measuring skill at recovering the deep structure of sentences.

All intermediate grade students in a northeastern Illinois suburban public school district were administered the Gates-MacGinitie Reading Test, Survey D, Form 1. The vocabulary subtest was used to screen out students reading below grade level and the comprehension subtest was used as a traditional measure of reading comprehension. Random selection procedures were used to select 315 subjects evenly distributed across grades four, five, and six, and to form three equal groups.

Each group was then administered one method of deep structure recovery. One method used was the Deep Structure Recovery Test developed by Simons (1970). The other two methods, developed by the author, paralleled the DSRT and were based upon the linguistic fact that paraphrased sentences have the same deep structure. One such method presented subjects with a pair of written paraphrased sentences with the logical subject and object deleted from one sentence. The subject was asked to supply the missing words which would make the sentences paraphrases of one another. The other method presented subjects with a sentence and required a written response which would paraphrase the prompt sentence. Criteria were established for scoring that minimized writing ability as a variable.

Based upon the evidence provided by the statistical analysis of the data, it was concluded that there was a significant positive relationship between reading comprehension and subjects' skill at recovering the deep structure of sentences for all three methods examined. Method 3 of deep structure recovery not only had the highest level of correlation but was also found to be significantly different than methods 1 and 2. In addition, grade level was found to be a significant variable in skill at recovering the deep structure of sentences. Sex was not found to be a significant factor in deep structure recovery skill.

The major implication of this study is in the potential the findings have for motivating continued research on a wide range of variables associated with the use of linguistic theory to better understand reading comprehension.

Order No. 77-20,874, 140 pages.

CHILDREN'S ABILITIES TO PRODUCE INFERENCES FROM WRITTEN AND ORAL MATERIAL

HILDYARD, Angela, Ph.D.
University of Toronto (Canada), 1976

At least three processes are involved in language comprehension: relating the information to prior knowledge; integrating the information; and going beyond the information to produce inferences. This study examines the extent to which children use their prior knowledge to aid them in integrating material and drawing inferences.

It is suggested that inferences can be viewed as varying in their relationship to world knowledge. At one end of this continuum are formal implications involving no reference to world knowledge and at the other are inferences which require obligatory reference to implicit world knowledge.

Five levels of inference are distinguished: Level 1 Inferences, which are formal and explicit, are made with no recourse to knowledge of the world; Level 2 Inferences bear a formal structure similar to Level 1 Inference, but the concepts are arranged in a manner which utilizes explicitly presented world knowledge; Level 3 Inferences involve the integration of material together with the application of implicit world knowledge; Level 4 Inferences require the use of knowledge of the world to produce inferences which are implicit in the material; Counter Factual Inferences incorporate the formal structure of Levels 1 and 2, but the information presented contradicts world knowledge.

These inferences were derived from stories, with different stories for each Inference level.

Consideration of research pertaining to the use of world knowledge in language comprehension and to distinctions between oral and written language, led to the development of a theoretical framework resulting in three major hypotheses. First, that the ease of drawing inferences depends upon the amount of world knowledge that can be used: inferences requiring no world knowledge (Level 1) should be harder than those requiring implicit, non-specialized world knowledge (Level 4). Second, that development consists in learning to draw implications, here, Level 1 and Counter Factual Inferences. Third, that inferences requiring the use of prior knowledge will be facilitated by an aural presentation while inferences requiring no world knowledge will be facilitated by a written presentation.

A total of 80 children from three grade levels participated in the study. Sixteen children from Grades 1, 3 and 5 listened to the series of stories and then answered Inference, Proposition and Memory (for simple details) Questions about those stories. Sixteen children from Grades 3 and 5 read the stories and subsequently answered the same set of questions. The data were analysed by means of Analyses of Covariance for repeated measures, using Inference scores as the criterion and Memory scores as the covariate.

Increasing the amount of prior knowledge which can be used to draw inferences had a strong facilitative effect on inferential ability; all the children produced fewer correct implications than inferences which were dependent upon explicit or implicit world knowledge.

With age children acquire the ability to produce implications: no developmental differences occurred for those inferences involving prior knowledge and expectancies (Level 2 and Level 4 Inferences) while marked developmental differences occurred for implications (Level 1 Inferences) and for inferences involving contradictory reference to prior knowledge (Counter Factual Inferences).

Reading was found to facilitate the production of implications and Listening was found to facilitate the production of Inferences involving world knowledge.

Clearly, the ability to produce inferences depends upon the extent to which the information can be mapped onto the expectancies of the child, the age of the child, and the mode of presentation of the material. Thus while young children are unable to produce implications, the provision of a meaningful context will enable them to succeed. We may view development as consisting of learning to constrain the information derived from verbal material to what is given explicitly, an ability that is aided by a written mode of presentation.

WORD OR MEANING-EMPHASIS IN ORAL READING: AN INVESTIGATION OF POSSIBLE DIFFERENTIAL EFFECTS ON COMPREHENSION IN SECOND-GRADE AVERAGE READERS

HONG, Laraine Kee Nyun, Ph.D.
The Ohio State University, 1977

Adviser: Professor Sharon E. Fox

This study attempted to test one aspect of the psycholinguistic theory of reading by determining whether reading for accurate word-identification as emphasized in oral reading actually leads to comprehension. Previous research on psycholinguistic theory has tended to be either psychological investigations of molecular aspects of reading behavior which apply experimental procedures in a laboratory setting, or descriptive educational research in a more natural context. This study was directed at testing one aspect of psycholinguistic theory using experimental procedures within a familiar context.

Given that oral reading is so prevalent in early primary classrooms, this investigation also was intended to re-assess teaching strategies. If comprehension is the goal of reading curricula, teachers need to know if, in fact, concentration on word-identification is the most effective facilitator of that goal.

There were three oral reading conditions: 1) word-emphasis with outside correction, 2) word-emphasis, no outside correction, and 3) meaning-emphasis, no outside correction. A fourth treatment was silent reading with meaning-emphasis. Under word-emphasis conditions subjects read the text as the experimenter revealed one word at a time. Meaning-emphasis was effected by instructing subjects to "read for meaning" and be prepared to answer follow-up questions.

Subjects were 20 second-grade average readers, 10 boys and 10 girls, from a public school in a predominantly white, middle-to upper-middle class suburb of Columbus.

Experimental stories were taken from standard basal textbooks. To establish stories as a generalization variable to be confounded with the random subjects variable, each subject read a different randomly selected story for each treatment. No story appeared more than once within a treatment. Stories were equated for difficulty level through a pre-test.

Comprehension was measured through a cloze test. A further index of a reader's interaction with text was frequency of miscues made during the cloze tests. These miscues were in turn compared for meaning-change and grammatical and semantic acceptability.

A one-factor repeated measurements analysis of variance was conducted for each dependent variable. No significant differences were obtained for any of the dependent measures.

The lack of significant differences may have been due to certain procedural problems. Forcing subjects to attend to single, whole words may not have been as stringent a representation of word-emphasis as a procedure such as sounding-out unfamiliar words in the text. The effect of silent reading was minimized by the apparent inability of certain subjects to actually read silently.

Lack of significant differences may also have been the result of subjects interacting more strongly with particular stories than with the treatments. Topic matter and concepts, language patterns, and cognitive demands of individual stories may have influenced subjects' performances to the degree that treatment effects were depressed.

An implication of this study is that the reading process and comprehension cannot be conceptualized as uniform, ideal constructs. Comprehension will be variously affected by different traits – experiential, linguistic, cognitive – and purposes of the reader. These constructs and purposes will then interact with particular characteristics of the text.

One of the most important results of this study is that subjects' cloze scores were comparable under word and meaning-emphasis. The implication is that the search for meaning can be a stronger determinant of the reading process than audio-visually based perception of the text. It would follow that classroom instruction should use and extend the child's focus on meaning as a basis for helping him learn to read.

Order No. 77-24,640, 144 pages.

THE CONTRIBUTIONS OF INFERENCE AND DISCRIMINATION PROCESSES TO FALSE RECOGNITION OF SENTENCES UNDER VARYING ORIENTING CONDITIONS AND IN ALTERNATE RECOGNITION PARADIGMS

HOORWITZ, Aaron N., Ph.D.
State University of New York at Albany, 1977

Varying explanations have been given for the false recognition by adult subjects of new sentences which are semantically similar to previously presented acquisition sentences. Bransford and colleagues (e.g., Bransford & McCarrell, 1974) have suggested that it is due to the inferences and integrations of information spontaneously constructed during sentence acquisition. However, Bower and colleagues (e.g., Anderson & Bower, 1973) have suggested that subjects store specific information from the acquisition experience, not inferences, and that subsequent false recognition of new sentences is due to discrimination failure occurring during recognition. It is possible that both processes are involved (Peterson & McIntyre, 1973), and that the clear emergence of either process may be affected by task demands. One type of task demand is orientation to the input. Craik and Lockhart (1972) have proposed that memory depends on the level of processing (i.e., semantic, sensory, etc.) which the subject is oriented to use, suggesting the additional possibility that false recognition may be influenced by the orienting condition existing at input.

These explanations were investigated in this dissertation research. The effect of orientation (semantic, syntactic, or control) was examined in two sentence recognition experiments used previously by Bransford. The explanatory processes of Inference and Discrimination were operationalized as quantitative variables and an assessment was made of their contributions to sentence recognition memory. The generality of these effects were examined across different orienting conditions in the two recognition experiments. Results were analyzed by hierarchical multiple regression analyses and analyses of variance.

Multiple regression revealed that the quantitative variable of Discrimination made significant contributions to some recognition responses. These results suggested that discrimination failure accounted for false recognition of very simple sentences when subjects had been syntactically oriented to acquisition sentences. This supported Bower's discrimination failure explanation of false recognition to some extent. It was also found that the role of discrimination processes depended on the orientation used at input. The quantitative variable of Inference did not relate to recognition enough to provide support for Bransford's theory.

Analyses of variance in both experiments revealed that subjects recognized old sentences heard at acquisition, false recognized new sentences that were semantically similar to old sentences, and rejected sentences that had undergone semantic transformations. These findings replicated those of Bransford, supporting his original view that a constructive inference process accounted for false recognition.

In Experiment 1 (which replicated Bransford & Franks, 1971, Experiment 2), the semantically oriented subjects false recognized new sentences to a greater extent than syntactically oriented subjects. This suggested that syntactically oriented subjects resisted false recognition because they retained specific features of the acquisition sentences, while semantically oriented subjects retained only meaning. The finding is compatible with Craik and Lockhart's view (1972) that memory is affected by the level of processing used at input. A significant difference between the semantic and the control group was incompatible with their view that adults are routinely oriented to meaning, a view which implies no difference between semantic and control.

In Experiment 2 (which replicated Bransford, Barclay, & Franks, 1972, Experiment 1) there was no significant effect of orientation; this can be attributed to the quite different orienting procedure used in Experiment 2, i.e., simple instructions to attend to either meaning, syntax, or to neither.

Order No. 77-20,677, 152 pages.

HUMOR AS A FACILITATOR IN THE LEARNING AND RETENTION OF WRITTEN INSTRUCTIONAL MATERIAL

HOUNDOUMADI, Anastasia, Ph.D.
University of Oregon, 1977

Adviser: Henry F. Dizney

The study investigated the effect of humor on learning and retention of prose material. College undergraduates (n=101) read in class either a serious biographical article or a humorous version of it. The humorous version contained eight identifiable instances where facts were presented in a humorous fashion. Following reading, the article was rated by the students on a set of bipolar dimensions. Two days later, the students who read the article and were present (n=64) were administered an unannounced 16 item retention test on the material covered by the article. All students were given the same sets of questions irrespective of the article version read. One set of the questions (k=8) tested the retention of facts presented in a humorous fashion while the other set of questions (k=8) tested the retention of facts that were not presented humorously. Two forms of the retention test were administered: a multiple choice, and a short answer essay test. Results indicated that the humorous version of the article was rated on the bipolar dimensions as more humorous and light but less true, honest, valuable and meaningful than the serious version. The source of items on the retention test proved a significant determinant of performance. Thus, the set of questions that tested the retention of facts presented humorously in the humorous version showed the highest retention. This pattern, however, was also found in the performance of students who read the serious version. This was observed in the scores of the subjects who took the multiple choice as well as the subjects who took the essay test form. One set of items was better retained overall. Two explanations are offered for this unexpected finding: a) the saliency of one set of facts was inadvertently increased in the serious version when their informational content was matched to that of the same facts presented humorously in the humorous version, and b) the overall difficulty level of the set of items testing the retention of non-humorously presented facts was empirically found to be lower than that of the other set of items, in both the experimental (humorous) and control (serious) conditions.

Order No. 77-26,448, 84 pages.

AN ANALYSIS OF INITIAL CONSONANT PHONEME-GRAPHEME CORRESPONDENCE ERRORS

HUNGERFORD, Foy Jean, Ed.D.
East Texas State University, 1977

Adviser: Mary L. Jernigan

Purpose of the Study: The purpose of this study was to determine whether there is a relationship between the phoneme-grapheme correspondence errors and the identified distinctive features of articulation of the initial consonant sounds. This study was therefore designed to obtain information concerning speech discrimination in relation to speech production in the learning of phoneme-grapheme correspondences. In addition, this study compared the frequency of errors of each phoneme-grapheme correspondence to the frequency of errors of each of the other phoneme-grapheme correspondences to determine whether particular phoneme-grapheme correspondences were more difficult than others.

Procedure: Thirty-eight subjects between seven and eight years of age were selected from a population of 140 second-grade pupils. The criteria for the selection of the subjects were that each pupil had made phoneme-grapheme correspon-

dence errors on Subtest 3: Initial Consonants from the Test of Phonic Skills, by Kenneth Smith and Henry M. Truby, and had been subsequently screened with the following tests: Templin-Darley Test of Articulation; Subtest 2: Print Discrimination from the Test of Phonic Skills, by Smith and Truby; the writer-constructed Letter Recognition Test; the Auditory Sensitivity Test; and the Otis Quick-Scoring Mental Abilities Test. An analysis of variance for repeated measures was computed in order to analyze the phoneme-grapheme correspondence errors categorized by manner of articulation and by voicing of phonemes. The significance of the difference between two correlated proportions was computed to determine whether particular phoneme-grapheme correspondences were more difficult than the other phoneme-grapheme correspondences.

Findings: The results indicated that there is no relationship between the phoneme-grapheme correspondence errors and the identified distinctive features of the different manners of articulation involved in this study. The comparison of the categories of voicing of the phonemes yielded one significant difference. There was a significant difference between the phoneme-grapheme correspondences categorized according to the classification of articulation of voiceless fricatives and the phoneme-grapheme correspondences categorized according to classification of articulation of voiced fricatives.

Conclusions: The data indicated that particular categorized phoneme-grapheme correspondence errors were related to the identified features of voicing of fricatives. The phoneme-grapheme correspondences in the category of voiceless fricatives were significantly less difficult to learn than the phoneme-grapheme correspondences in the category of voiced fricatives. In the comparison of the frequency of errors of each phoneme-grapheme correspondence to the frequency of errors of each of the other phoneme-grapheme correspondences, the data indicated that, of the 327 comparisons treated, there were twenty-one significant differences in the learning difficulty of the phoneme-grapheme correspondences.

Order No. 77-27,553, 156 pages.

THE RELATIVE EFFECTS OF DIFFERENT ERROR TYPES ON UNDERSTANDING OF CONNECTED DISCOURSE

NICHOLSON, Thomas William, Ph.D.
University of Minnesota, 1977

Beginning readers often misidentify words. But to what extent do these misidentifications interfere with their ability to make sense of written material? There is very little in the way of an answer to this question. The primary purpose of this study was to investigate this issue. A secondary purpose was to provide a data base for an evaluation of two competing (and influential) views of the beginning reading process--that of Gough (1972) who argues that errors are misleading, and Goodman (1969) who argues that errors are an inevitable part of meaningful reading.

Eighty grade three students (41 girls, 39 boys), all about nine years, all above grade level in reading ability, and from a middle class suburb of the Twin Cities, Minnesota, participated in the study.

In this experiment, narrative stories typical of those used in schools, were transformed by embedding different types of simulated nominal reading errors (called "simulates") in the text. The anomalized stories were then given to skilled readers (it was assumed they would read the simulates correctly). It was also assumed that the proficient readers were simulating the processes which unskilled readers would use when faced with text containing words they do not know and which they have misidentified.

Each subject read six different stories, each embedded with a different kind of simulated error type. Some subjects received difficult stories; others, easy stories. Some received stories with fifteen per cent nominal errors; others, six per cent. Some could look back at the text when answering questions; others could not. The complete design was a 2^4 x 6 factorial, with repeated measures on two factors.

Cloze-type probes were used to test explicitly dependent comprehension. Inferential comprehension probes included a multiple choice and an open-ended format to two WH-type questions.

The results showed that the important question in relation to the effects of errors on comprehension is the kind of comprehension tested and the criterion used for determining what is acceptable. For explicitly dependent responses, using a broad criterion (which included semantically appropriate and "sensible" responses), the semantically related simulate type was significantly more helpful than all others except the correct version. When the strict criterion was used (which included only the deleted target nominal), the simulated guesses were not only unhelpful but misleading. The most useful simulate was the non-response. Inferential comprehension, however, was unaffected by simulate type, suggesting that, at more general levels of understanding, errors are less disruptive. Other results showed that it was more important to know some of the target concepts before reading the story, that it was more useful not to look back when answering questions about difficult stories, and that high error rate was no more disruptive than low error rate.

The results supported both the Gough and the Goodman points of view, depending on the kind of comprehension tested, and the criterion for acceptability of responses. The disruptive effects of errors for accurate comprehension do suggest that the Goodman model lacks completeness.

A follow-up naturalistic study was conducted, using twenty unskilled readers, from grades three to six, reading the correct versions of the same stories. The results, although tentative, were in agreement with the experimental findings.

Order No. 77-26,143, 264 pages.

THE RELATION BETWEEN SYNTACTIC FORM AND FAMILIARITY OF CONTENT TO READING COMPREHENSION

ODDEN, Eleanor R., Ed.D.
Columbia University Teachers College, 1977

Sponsor: Professor Margaret Jo Shepherd

This study was designed to investigate the relationship between certain language variables and comprehension of the grammatical construction "because." The study was based on psycholinguistic theory and research which has emphasized and demonstrated the importance of syntactic awareness and some degree of familiarity to comprehension.

Two conditions of Sentence Unit (one-sentence vs. two-sentence), Cue (cue present vs. cue absent), and Content (familiar vs. unfamiliar) were varied over passages on a silent reading test given to poor and good readers in the fourth grade. A 2 x 2 x 2 x 2 analysis of variance of the data revealed no interactions between the three language variables and Reading Comprehension Level. Familiarity of content helped both good and poor readers. There was no relationship evident between Sentence Unit and comprehension. Good readers appeared more sensitive to the two cue conditions than poor readers.

The findings suggested that preparation of students for new units of content instruction must be fairly extensive, that sentence unit does not have to be of major concern when preparing reading material, and that there may be diagnostic implications in the decreased response modeling of the poor readers.

Order No. 77-22,281, 124 pages.

RETENTION AS A FUNCTION OF COGNITIVE LEVEL OF OPERATION, SCORE ON AN ACQUISITION TEST, AND FEEDBACK TIMING

POUND, Larry Dean, Ph.D.
Kansas State University, 1977

This research was performed to examine the effect of delayed information feedback on retention of verbal information.

After studying a reading selection from a general psychology text, students took a multiple choice examination over the content of that reading. The test consisted of 40 questions, 20 rote memory items and 20 conceptual/analytical questions (question Level I and Level II respectively).

One group of subjects received immediate information feedback after answering each test item (Immediate Feedback Condition) and another group received feedback after a delay of 24 hours (Delayed Feedback Condition). Each group was retested seven days after receiving feedback.

Analysis of the number of errors made by the groups indicated that there were no retention differences between the Immediate Feedback and Delayed Feedback groups for total errors, or for errors by question level.

On the basis of the acquisition test, subjects were divided into high and low scoring groups according to feedback condition. The error scores of the groups were examined to determine if feedback timing differentially affected high and low scoring subjects. There was no differential effect of feedback on subjects of different ranks. No evidence was found that indicated an interaction of question level and rank of subject. None of the null-hypothesis studied were disproven. Order No. 77-26,053, 116 pages.

THE EFFECTS OF READING, LISTENING, AND TELEVISION PRESENTATIONS ON STUDENTS' VERBAL COMPREHENSION

SCHAFFER, Marcy Perl, Ph.D.
Columbia University, 1977

The purpose of this study was to determine the effect of method of presentation of material on students' comprehension. Specifically, the study compared the instructional effectiveness of reading, listening, and televised presentations of two half-hour narrative historical drama lessons and two fifteen minute documentary-style science lessons.

Subjects were 155 eighth grade students from two suburban public schools. Three comparable classes were presented with narrative historical drama materials and three comparable classes were presented with the science materials. All six classes were heterogeneous and equivalent with respect to the mean ability level of the students (mean IQ: 110). Moreover, the schools report that students were assigned to these classes in a random manner.

On each of two sessions, each class was presented with a lesson or program through either reading, listening, or television. Thus all subjects were presented with two equivalent lessons, each through a different method of presentation. The tests for the two compared lessons had previously been equated with respect to the mean and standard deviation of item difficulty.

An effort was made to transmit the same or equivalent information through the three presentation conditions. The televised presentations consisted of videotape presentations of actual television shows. The listening and reading presentations were derived from the videotapes and the scripts of the shows. Relevant visual information was verbally paraphrased and incorporated into the texts of the reading and listening presentations. Since these particular television programs did not contain any media specific "embellishments" such as charts, or diagrams, it was possible to verbally paraphrase relevant visual information. The time exposure to the reading, listening, and televised presentations was the same.

After each presentation, subjects answered comprehension questions (38 for the historical dramas and 24 for the science materials). The comprehension measures were traditional written tests comprised of short, open-ended recall items that included both fact and inference questions. The type of comprehension tapped by these measures was verbal comprehension. These questions were not designed to tap types of understanding that could only be transmitted in an audio-visual manner. The comprehension test for each lesson was the same for all three methods of presentation.

One way analyses of variance and Bonferroni contrasts performed for each lesson, and t tests for paired observations comparing the scores of the same individuals in different presentation conditions, all indicated that the reading and television presentations resulted in significantly higher comprehension than the listening presentation condition.

High correlations (.9 when corrected for attenuation) between the scores of individuals in two different presentation conditions demonstrate that students performed in a similar manner in different presentation conditions. This finding together with the fact that the difference scores of the same individuals in different presentation conditions were small, normally distributed, argues against the notion of substantial individual differences in relative performance in different presentation conditions.

High correlations (.6-.9) were obtained between subjects' scores in the reading, listening, and television conditions and their scores on standardized intelligence and reading comprehension measures.

The finding that reading produced greater comprehension than listening is discussed in terms of the greater "reference" (ability to refer back to the information) and permanence of print in contrast to spoken language. The superiority of television over listening may be attributed to the extra cues and redundancy provided by the television presentation as well as to the attention-focusing quality of television.

In summary, when comparable material is presented to junior high schools through reading, listening, or television, there appears to be an advantage for the television and reading methods over the listening method.

Order No. 77-24,344, 16

AN EXPLORATORY STUDY OF PERCEPTIONS OF THE READING PROCESS AND CONTROL OF THAT PROCESS IN NARRATIVE AND EXPOSITORY MATERIAL BY SELECTED 9TH GRADE READERS

STANSELL, John Coleman, Ed.D.
Indiana University, 1977

Chairperson: Dr. Carolyn L. Burke

Relatively few of the 8,000 studies reported since 1925 have examined reading as a process; consequently, little is presently known about variations in that process across different kinds of reading materials. The present study involved consulting available research dealing with the reading process in varying materials to examine findings and identify process-centered methodologies useful in developing hypotheses concerning the following questions: 1. How do readers perceive the reading process and their own reading strategies? 2. What strategies do readers actually use in reading narrative and expository materials? 3. What differences do readers perceive in narrative and expository writing? 4. What relationships exist among the variables listed above?

Introspection, retrospection, and miscue analysis were identified as tools for the collection and analysis of data relevant to these questions. Six 9th grade readers identified as proficient by their English teacher were interviewed about the reading process and their own strategies, asked to read and retell a narrative and an expository selection, and interviewed again concerning their perceptions of differences in the materials read. All interviews, readings, and retellings were tape recorded for analysis. Interview data were analyzed to identify a coherent view of the reading process for each reader, and to identify differences perceived in materials. Oral reading miscues were analyzed to identify variations in the reading process across selections and to allow comparison of readers' perceptions of reading, actual performance, and views of differences in materials read.

It was observed that these readers described their own preferred reading strategies as word attack skills and tended to view the use of larger language units as either supplementary strategies or bad habits. They also tended to generate word substitutions which were graphically and phonetically similar to the test word on both selections. Their reading of the expository selection produced fewer miscues and more miscues that were not disruptive of meaning than did their reading of the narrative selection. Discrepancies between the relatively high percentage of miscues that did not disrupt meaning and the relatively low retelling scores indicated the need for additional data to determine whether the retelling scores were indicative of low reader proficiency or of an inadequate conceptual base for internalizing meaning.

An additional 9th grade reader performed much like the first six had done on the two selections with respect to miscue patterns and retelling score. She then read and retold a selection on a different topic, demonstrating both effective reading strategies and a high retelling score. This indicated that her performance on the first two selections was strongly influenced by a lack of conceptual development, and this indication was generalized to the first six readers. Finally, readers' perceptions of the differences in the two selections centered around the focus of the selections, one upon an individual and the other upon a group.

Hypotheses generated from these observations include: 1. These readers tended to view reading as an exact word recognition process. 2. Expository material seemed to allow these readers greater use, though not necessarily more effective use, of the syntactic and semantic cue systems of language. 3. These readers tended to be unaware of the basic differences in narrative and expository writing. 4. Prior reading instruction controls perceptions of the reading process which, in turn, controls and limits reading performance and views of materials read. 5. The experiential background of a reader may be a more significant factor in reading than are differences in mode of writing.

These hypotheses have implications for research, as well as for instruction. Exact and modified replications of this study are needed to validate and extend these hypotheses. Instruction should support concept development and greater use of language competence in reading. Order No. 77-27,013, 169 pages.

RELATIONSHIPS BETWEEN QUALITY OF ORAL READING ERRORS AND ORAL SYNTACTIC DEVELOPMENT OF SECOND-GRADE CHILDREN

STURDIVANT-ODWARKA, Anne Marita, Ph.D.
The University of Iowa, 1977

Supervisors: Professor G. Robert Carlsen
Associate Professor Joyce E. Hood

Previous research in language development and reading ability has examined differences in language ability according to reading level but has not determined whether or not there are certain characteristics common to readers at one level of language development that separate them from readers at another (or the next) level. The present study used a qualitative measure of reading, namely oral reading error analysis, to explore the oral reading characteristics associated with syntactic development of second-grade children.

First, intercorrelations were calculated between syntactic development, reading ability, intelligence, socio-economic status, and sex, in order to determine the extent to which other variables might influence the relationship between reading ability and language development. These correlations were based on the scores of 90 second-grade students on an adaptation of Chomsky's (1971) Linguistic Interview and Language Development Sequence, Primary Reading Profiles (1968), the Lorge-Thorndike Intelligence Test (1964), and Hodge-Siegel-Rossi Prestige Scores (1966). Intercorrelations for the five variables indicated a strong, positive relationship between intelligence and reading ability (.64). Less strong, but statistically significant, correlations were found between syntactic development and reading ability (.38) and for syntactic development and intelligence (.37).

Then, 27 children within the 2.3 to 3.3 reading ability range were selected from the original 90, so that the reading selections would be of approximately the same difficulty level for all children when reading aloud. These children were given Standard Reading Inventory (1966) word lists to determine isolated word recognition ability and were asked to read aloud four stories totalling 532 words, which ranged in readability level from 2-1 to 3-1. Four trained judges scored the taped oral reading according to procedures described by Hood (1976). Subject scores were the means over the four judges for each of 14 error categories.

When the influences of word recognition and intelligence were controlled, results of the partial correlations between syntactic development and the 14 oral reading categories revealed that syntactic development as measured by the adaptation of Chomsky's (1971) Linguistic Interview was not related to contextual appropriateness of errors, as was expected. Language development was, however, negatively related to porportion of errors corrected, correction of graphically dissimilar errors, correction of errors appropriate to the preceding context, and correction of errors appropriate to the sentence.

In summary, syntactic development was related to children's use of graphic and contextual cues only in terms of correction strategy. The children at higher stages of syntactic development corrected fewer errors that made sense at the sentence but not the passage level. On the other hand, children at lower language stages corrected errors more frequently, thus producing a more graphically and contextually accurate oral rendition of a story. A possible explanation for these differences in correction strategy is that linguistically more mature children may be using language redundancy to correct internally those errors that they do not correct orally or that these children are not verbalizing what they do, indeed, understand cognitively. Perhaps as children become more fluent silent readers, their oral reading accuracy decreases in accordance with more efficient silent reading. This is, however, speculation and needs to be substantiated by further research which takes into account the reliability and validity of the language-reading measures and includes an in-depth assessment of reading comprehension. Order No. 77-21,174, 113 pages.

A COMPARATIVE STUDY OF THE CONTEXTUAL CLUES FOUND IN PROSE AND POETRY FORMS OF LITERARY DISCOURSE

TOMAS, Douglas Alan, Ph.D.
The University of Texas at Austin, 1977

Supervisors: William R. Harmer, James L. Kinneavy

The purpose of this study was to investigate the fluent reader's use of contextual clues as aids in gaining meaning in prose and poetry forms of literary discourse. The cloze procedure and the introspection technique were used; subjects attempted to verbalize the cognitive processes used in replacing deleted words.

Ten graduate English majors at the University of Houston were the subjects. These participants had equivalent grade point averages, undergraduate degrees, Graduate Record Examination scores, and reading subtest scores on the Wide Range Achievement Test. The mean grade equivalent score on the Wide Range Achievement Test was 18.6.

Subjects responded to 21 complete samples of literary discourse containing 513 cloze situations. Literary discourse was stratified into narrative prose, dramatic prose, narrative poetry, dramatic poetry, and lyric poetry. Only exact word replacement of the deleted nouns, verbs, adjectives, and adverbs was scored as correct.

Subjects' verbalizations of the clues used in correctly replacing deleted words were grouped into 14 classes of contextual clues used effectively in literary discourse. An independent judge was used to substantiate the reliability of the classifications. Eleven null hypotheses were used to test the degree of difficulty of replacing deleted words in the five forms of literary discourse with .05 set as the level of significance. When cloze scores were compared using appropriate statistical analysis, significant differences in difficulty of replacement were found between and within groups of literary prose and poetry.

The following conclusions were drawn: 1. Context clues used effectively in literary discourse can be classified into 14 classes of clues with substantial reliability (.81). 2. Eleven of the 14 classes of clues used in literary discourse were also identified by Ames (1965). 3. Two classes of clues are possibly unique to literary discourse: Clues Provided by the Knowledge of the Author's Style and Clues Provided by Rhyme or Meter. 4. Replacement of deleted words is significantly more difficult in poetry than in prose. 5. The use of context clues is a relatively effective means of determining meaning of unknown words in prose and narrative poetry; their usage in dramatic and lyric poetry is ineffectual. 6. The cloze scores generally accepted as indicative of independent, instructional, and frustrational levels of reading comprehension may be inappropriate for literary discourse.

Order No. 77-23,040, 135 pages.

A STUDY OF PREFERRED LEARNING MODES AND THEIR RELATIONSHIP TO THE AMOUNT OF RECALL OF CVC TRIGRAMS

URBSCHAT, Karen Spangenberg, Ph.D.
Wayne State University, 1977

Adviser: William Hoth

This study examined the relationship between sensory preference and the amount of recall of CVC trigrams. The major issue was that of attempting to determine if children learned more CVC trigrams when taught in a preferred mode or in a non-preferred mode. A secondary purpose was to ascertain the existence of a superior modality, if any, and a superior treatment, if any.

The sample was comprised of 135 first-grade pupils between the ages of 5.11 and 6.11 years, from the Detroit suburb of Riverview. These pupils met criteria of 90–110 I.Q. (as obtained from the Peabody Picture Vocabulary Test), had no vision or hearing impairment, were from cross socio-economic groups, and had been diagnosed as visual, auditory, or auditory-visual learners by results of test scores taken from the Monroe Reading Aptitude Test. Each set of modality groupings consisted of 45 children. Each preference group of 45 children was then divided into groups of 15 for purposes of treatment. CVC trigrams, which were used to minimize prior learning, were presented to each group of 15 children by one of three treatment methods, auditory, visual, or auditory-visual. One group of 15 children in each preference group received treatment to match their modality preference. The other two groups of 15 children did not.

The main effects of treatment and modality and the interaction effect were treated using a 3x3 analysis of variance design. The alpha level was set at .05. Significant results occurred, so a post hoc procedure, the Duncan Multiple Range Test, was applied to determine exactly where the significances were.

The results of this study yielded no data to indicate the existence of a superior modality. Each modality, visual, auditory, and auditory-visual, was important only to the individual and his preference. However, two approaches (treatments) were superior, the auditory-visual and visual approach, regardless of the modality of the child. This suggests the auditory-visual approach and the visual approach can be used successfully with all children because of their significance ($p < .05$) with the auditory mode, the visual mode, and the auditory-visual mode.

Further, this study demonstrated that a modality preference in first-grade children can be ascertained and that superior and significant results occurred when treatment was matched to modality. That is, auditory learners learned best through an auditory approach, visual learners learned best through a visual approach, and auditory-visual learners learned best through an auditory-visual approach.

Modalities obviously need more refinement. This study suggests that it is a promising concept that needs further exploration. Recommendations for further study are included in the dissertation.

Order No. 77-24,029, 87 pages.

AN EMG INVESTIGATION OF SUBVOCALIZATION DURING THE SILENT READING PROCESS

WELLS, Jennifer Lynn, Ph.D.
University of Toronto (Canada), 1976

Subvocalization** is common during silent reading. This covert oral behavior can be detected by electromyographic (EMG) recording of the muscles of the larynx.

To date, relatively few studies have investigated the function of subvocalization during silent reading. An exception is a study by Hardyck and Petrinovich (1970) reporting that subjects reading difficult text with normal subvocalization comprehended more than other subjects reading the same text while suppressing subvocalization.

Because of the nature and size of their sample, the generality of their finding may be equivocal. Additionally, they did not establish the chance level of performance on their comprehension measures, nor did they comment on the observation that their suppressing readers had read somewhat faster than their subvocalizing readers. Until alternative explanations for these findings based on these factors can be ruled out, their conclusion that subvocalization aids in the comprehension of difficult reading material cannot be accepted.

The purpose of this study was to establish a more stringent test of Hardyck and Petrinovich's hypotheses that comprehension is lower on difficult text read with suppression. A second purpose was to explore further the nature of the relationship between reading speed, comprehension and subvocalization.

Forty-eight post-secondary students read comparable practice texts to establish their reading speed with subvocalization and with suppression. They were then randomly assigned to one of three experimental conditions: (1) the Uncontrolled Normal Reading Speed Condition (no speed controls applied); (2) the Controlled Normal Reading Speed Condition (subjects controlled throughout the experimental readings to their rate demonstrated with subvocalization); (3) the Controlled Suppressed Reading Speed Condition (subjects controlled throughout at their suppressed rate).

The experimental task for all three conditions was to read one easy and one difficult text each with subvocalization and suppression. Reading speed was controlled by means of an SRA Reading Rate Accelerator. For the Uncontrolled Condition, text were presented in the SRA but the shutter was not operated. Suppression training was expedited by providing auditory feedback on the activity of the laryngeal muscles. This activity was also charted by a Beckman RS 2-channel polygraph with an EMG adaptor. The charts provided the basic EMG data. Comprehension data came from multiple-choice tests administered after each reading.

Preliminary analysis on the data did not reveal the anticipated increase in reading speed on texts with suppression nor was there a lower level of EMG activity during the suppressed reading of all subjects.

Analyses of variance on the remaining subjects revealed that although subjects did tend to comprehend less on difficult material read with suppression, the decrement was not significant. Subjects in the two controlled reading speed conditions suffered greater losses of comprehension on difficult text read with suppression but these losses were significant only when comparing them to the performance of subjects in the Uncontrolled Normal Condition.

An ANOVA on the EMG levels of text being read with subvocalization revealed that the predicted increases in EMG activity were not significant on difficult text. The predicted increases in EMG activity on the controlled conditions did occur, however, and the differences between all three conditions were significant.

These findings were interpreted as being moderately supportive to an overall view of subvocalization as being an ancillary device employed by the reader during stress. Stress could be conceptual or perceptual difficulty, distractions and so on. The most stressful condition in this study appeared to be the impossing of speed controls.

The failure to replicate Hardyck and Petrinovich's finding casts doubt on the generality of their conclusion that subvocalization aids in the comprehension of difficult text at least to competent adult readers. For this reason, future research should probably focus on specific subgroups of readers with varying levels of skills development.

**Subvocal behavior has been referred to by many names in the literature. The terms silent speech, covert oral behavior and inner speech all refer to the behavior which is called subvocalization in this study. Subvocalization is defined here to include both the minute movements in the speech musculature (the articulatory component) and any accompanying auditory image (the auditory component) which occurs during silent reading. It is only the former component which is accessible; however, at the present time, the latter component is merely a hypothetical construct.

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